WHAT IS CLAIMED IS:

1. A hologram recording method comprising irradiating an optical recording medium with a signal light beam and a reference right beam which has a predetermined shape and intensity on the optical recording medium corresponding to an intensity distribution of the signal light beam on the optical recording medium.

2. A hologram recording method according to claim 1, wherein the intensity distribution of the reference light beam on the optical recording medium substantially coincides with the intensity distribution of the signal light beam.

3. A hologram recording method according to claim 1, wherein the reference light beam has a wavefront which is generated by using a computer-generated hologram.

4. A hologram recording method according to claim 3, wherein the computer-generated hologram is a kinoform in which only a phase of an object light beam is recorded.

5. A hologram recording method according to claim 4, further comprising designing the kinoform so as to generate the reference light beam having a random phase.

6. A hologram recording method according to claim 1, further comprising irradiating the optical recording medium with the signal light beam after the signal light beam has been Fourier transformed by a lens.

7. A hologram recording method according to claim 6, further comprising recording the hologram by using only a Fourier transform component in which a spread ζ from a zero-order light beam of the Fourier transform image of the signal light beam is defined by the following formula in a case in which the signal light beam holds a two-dimensional digital data image:

$$0 \leq \zeta \leq 4f\lambda/d$$

where f is a focal distance of the lens for irradiating the optical recording medium with the signal light beam, λ is a wavelength of the signal light beam, and d is a length of one side of one bit data of the signal light beam.

8. A hologram recording method according to claim 6, further comprising:

setting a region A corresponding to the minimum Fourier transform component essentially required for data reproduction to the range of the following formula (6),

$$0 < A < (4f\lambda/d)^2 \quad (6)$$

where f is the focal distance of the lens for irradiating the optical recording medium with the signal light beam, λ is

the wavelength of the signal light beam, and d is a length of one side of one bit data of the signal light beam;

designing the kinoform so that only the region A is irradiated with the reference light beam having the random phase; and

generating the reference light beam by using the computer-generated hologram in which the kinoform has been recorded.

9. A hologram recording method according to claim 1, further comprising supplying a recording signal of each page with predetermined timing so that each page of the hologram is recorded from a recording start position at an interval of a predetermined amount of shift.

10. A hologram recording method according to claim 9, further comprising performing shift multiplex recording by rotating the optical recording medium.

11. A hologram recording method according to claim 9, further comprising performing the shift multiplex recording by moving the optical recording medium in line.

12. A hologram recording method comprising:

(a) separating a laser beam into a light beam for a

reference light beam and a light beam for a signal light beam;

(b) setting a region corresponding to a minimum Fourier transform component essentially required for data reproduction;

(c) designing a kinoform so that only the region is irradiated with the reference light beam having a random phase;

(d) generating the reference light beam from the light beam for the reference light beam by using a computer-generated hologram in which the kinoform is recorded;

(e) generating the signal light beam from the light beam for the signal light beam by using a spatial light modulator;

(f) Fourier transforming the signal light beam with a lens when the signal light beam holds a two-dimensional digital data image; and

(g) recording a hologram by irradiating an optical recording medium with the reference light beam and the Fourier-transformed signal light beam at the same time.

13. A hologram recording method according to claim 12, wherein the reference light beam has a predetermined shape and intensity on the optical recording medium corresponding to an intensity distribution of the signal light beam on the optical recording medium.

14. A hologram recording method according to claim 13, wherein

the intensity distribution of the reference light beam on the optical recording medium substantially coincides with the intensity distribution of the signal light beam.

15. A hologram recording method according to claim 12, wherein the reference light beam generating process (d) includes generating the reference light beam having a wavefront by using the computer-generated hologram.

16. A hologram recording method according to claim 12, wherein the process (f) of performing Fourier transformation to the signal light beam includes recording the hologram by using only a Fourier transform component in which a spread ζ from a zero-order light beam of a Fourier transform image of the signal light beam is defined by the following formula in a case in which the signal light beam holds a two-dimensional digital data image:

$$0 \leq \zeta \leq 4f\lambda/d$$

where f is a focal distance of the lens for irradiating the optical recording medium with the signal light beam, λ is a wavelength of the signal light beam, and d is a length of one side of one bit data of the signal light beam.

17. A hologram recording method according to claim 12, wherein the region setting process (b) includes setting a region A to

a range of the following formula (6),

$$0 < A < (4f\lambda/d)^2 \qquad (6)$$

where f is the focal distance of the lens for irradiating the optical recording medium with the signal light beam, λ is the wavelength of the signal light beam, and d is a length of one side of one bit data of the signal light beam.

18. A hologram recording method according to claim 12, further comprising supplying a recording signal of each page with predetermined timing so that each page of the hologram is recorded from a recording start position at an interval of a predetermined amount of shift.

19. A hologram recording apparatus comprising:

a light source for outputting a coherent light beam;

a spatial light modulator for modulating the light beam from the light source in accordance with data and generating a signal light beam; and

a holographic optical element for generating a reference light beam having a predetermined shape and intensity on an optical recording medium corresponding to an intensity distribution of the signal light beam on the optical recording medium, from the coherent light beam outputted from the light source,

whereby a hologram is recorded by irradiating the optical

recording medium with the signal light beam and the reference light beam.

20. A hologram recording apparatus according to claim 19, wherein a kinoform is recorded in the holographic optical element, and the kinoform is designed to record only a phase of an object light beam in the kinoform, for generating the reference light beam having a random phase.